A. Bay
Algebra 1

Name: Key
Date: _____

Solving Multi-Step Equations
1.2

Multi-Step Equations are equations that take more than one operation to get to the answer.

To solve multi-step equations, work backward by undoing operations.
Remember: Addition/Subtraction are inverse operations and Multiplication/Division are inverse operations.

Example1: Solve the following equations.

(a). $-12 = 9x - 6x + 15$ * combine like terms

$-12 = 3x + 15$
$-15 \quad -15$
$\frac{-27}{3} = \frac{3x}{3}$
$-9 = x$
$x = -9$

(b). $\frac{h+6}{5} = 2$ · 5

$h + 6 = 10$
$-6 \quad -6$
$h = 4$

Distributive Property: To multiply a sum or difference by a number, multiply each number in the sum or difference by the number outside the parentheses. Then evaluate.

(c). $2(1 - x) + 3 = -8$ distribute to ALL terms in the parentheses

$2 - 2x + 3 = -8$ * combine like terms

$5 - 2x = -8$
$-5 \quad -5$
$\frac{-2x}{-2} = \frac{-13}{-2}$
$x = \frac{13}{2}$
or 6.5

(d). $\frac{2}{3}(n - 6) = -10$

$\frac{2}{3}n - 4 = -10$
$+4 \quad +4$
$\frac{\frac{2}{3}n}{\frac{2}{3}} = \frac{-6}{\frac{2}{3}}$
$n = \frac{-6}{1} \cdot \frac{3}{2}$
$n = -9$

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Example 2: Write an equation for each sentence, and then solve the equation.

(a) *Fourteen more than a number is equal to twenty-seven.*

addition

$14 + x = 27$
$-14 \quad -14$
$x = 13$

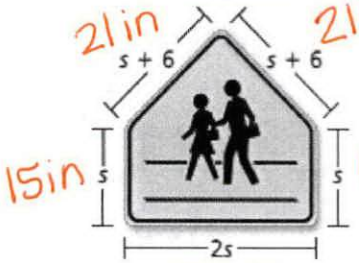
(b) *Six times the sum of a number and 15 is −42*

$6(x+15) = -42$
$6x + 90 = -42$
$-90 \quad -90$
$6x = -132$
$x = -22$

Example 3: Write and solve equations which model these real-life situations.

(a) The perimeter of the school crossing sign is 102 inches. What is the length of each side?

add ALL sides P=102



P = sum of all sides
$102 = (s+6)+(s+6)+s+2s+s$
$102 = s+6+s+6+s+2s+s$ * combine like terms
$102 = 6s + 12$
$-12 \quad -12$
$90 = 6s$
$\frac{90}{6} = \frac{6s}{6}$
$s = 15$

The length of the sides are 21in, 21in, 15in, 15in, 30in

(b) Your school's drama club charges $4 per person for admission to a play. The club borrowed $400 to pay for costumes and props. After paying back the loan, the club had a profit of $100. How many people attended the play?

→ "per" is the key word for where the variable goes
└ subtraction
total

$100 = 4x - 400$
$+400 \quad +400$
$\frac{500}{4} = \frac{4x}{4}$
$125 = x$

125 people attended the play.

Homework: